

WHAT IS CLAIMED IS:

1. A communication method in a code division multiple access (CDMA) mobile communication system wherein radio channels between a base station and a plurality of mobile stations include a plurality of traffic channels used for transmitting upward data packets directed from the mobile terminals to the base station and for transmitting downward data packets directed from the base station to the mobile terminals,
- 10 a reservation channel used for transmitting reservation packets each indicative of a traffic channel assignment request from a mobile terminal to the base station, and a reply channel used for transmitting reply packets each indicative of a traffic channel through which data
- 15 is to be transmitted and received from the base station to a mobile terminal, and said reservation, reply and traffic channels are assigned unique spreading codes, respectively, said method comprising the steps of:
- transmitting a reservation packet from a
- 20 mobile terminal having a request for data transmission onto said reservation channel at arbitrary timing;
- transmitting a reply packet onto said reply channel from the base station to specify a traffic channel and a time slot to be used to each mobile
- 25 terminal which has transmitted said reservation packet; and
- transmitting a data packet from each mobile terminal which has transmitted said reservation packet

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in the specified time slot on the traffic channel specified by said reply packet.

2. A communication method according to claim 1, wherein:

- 5           said each mobile terminal having a request for data transmission applies a spreading code unique to said reservation channel having a period shorter than a spreading code applied to the spreading of a data packet to be transmitted on said traffic channel
- 10 in order to apply spread-spectrum to said each reservation packet; and
- said base station processes a received signal using a matched filter in which said spreading code unique to said reservation channel is set, said base
- 15 station utilizing the periodicity of said spreading code to separate outputs of said matched filter into a plurality of signal trains corresponding to respective reservation packets.

3. A communication method according to claim 1,
- 20 further comprising the steps of:

- giving a local address shorter than unique address information assigned to each mobile terminal from said base station to said each mobile terminal;
- wherein said base station sets a local
- 25 address in a destination address field of said reply packet and transmits said reply packet; and
- receiving the packet including a local

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address given to each mobile terminal in the destination address field by said each mobile terminal.

4. A communication method according to claim 1, further comprising the steps of:

5 giving a link number shorter than address information unique to each mobile terminal from said base station to said each mobile terminal;

wherein said each mobile terminal transmits a data packet including said link number as a destination address onto a traffic channel.

5. A communication method according to claim 1, further comprising the steps of:

periodically transmitting from said base station busy tone information indicative of a traffic situation in its service area through said reply control channel or through a channel dedicated to the busy tone information;

wherein each mobile terminal having a request for data transmission controls the transmission of a reservation packet based on said busy tone information.

6. A communication method according to claim 5, wherein:

said base station estimates, based on a number of reservation packets received during a previous constant period, a number of reservation packets to be generated in the next constant period, and generates said busy tone information based on said estimated value and a number of packets scheduled to be

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transmitted during the next constant period.

7. A communication method according to claim 1,  
wherein:

5 said each mobile terminal requests the  
transmission of a plurality of data packets through a  
single reservation packet.

8. A communication method according to claim 3,  
wherein:

10 said base station uses a control packet for  
giving a local address to a mobile terminal to specify  
a reply channel through which the mobile terminal is to  
perform receiving operations,

9. A communication method according to claim 1,  
wherein:

15 said base station continuously transmits a  
pilot signal including a synchronization signal  
component through a pilot channel or through said reply  
channel such that each mobile terminal identifies a  
time slot on said traffic channel based on said  
20 received pilot signal.

10. A communication method in a radio  
communication system wherein a base station and a  
plurality of radio terminals communicate through a  
reservation channel, a reply channel and a plurality of  
25 traffic channels formed in accordance with a code  
division multiple access (CDMA) scheme in radio  
channels, said method comprising the steps of:

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transmitting reservation packets onto said reservation channel from said respective radio terminals requesting data transmission asynchronously with each other;

- 5           after separating a plurality of reservation packet signals having partially overlapped portions on a time axis, received through said reservation channel, corresponding to reservation packets, and performing a receiving process on the reservation packets,
- 10           transmitting from said base station a reply packet for specifying a traffic channel and a time slot to be used to each radio terminal which is a source of each received reservation packet through said reply channel; and

- 15           transmitting a data packet in a specified time slot on a traffic channel specified by said reply packet from said each radio terminal.

11.       A communication method according to claim 10, further comprising the steps of:

- 20           after transmitting, from said base station to a radio terminal identified by a destination address in a data packet received from said traffic channel, said reply packet for specifying a traffic channel and a time slot to be used by said radio terminal for
- 25           reception through said reply channel, transmitting said received data packet in said specified time slot on said specified traffic channel; and

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receiving the data packet in said specified time slot on said traffic channel specified by said reply packet at the radio terminal which is the destination of said reply packet.

- 5 12. A radio terminal apparatus for communicating with a base station through radio channels comprising:

means for transmitting a reservation packet processed with a spreading code unique to a reservation channel to said base station asynchronously with said  
10 base station;

means for receiving a reply packet processed with a spreading code unique to a reply channel, transmitted from said base station at predetermined time slot timing synchronized with said base station;  
15 and

means for transmitting and receiving a data packet processed with a spreading code unique to a particular traffic channel at predetermined time slot timing on said particular traffic channel specified by  
20 said reply packet.

13. A base station for communicating with a plurality of radio terminals, each having a unique address, using spread-spectrum packets through a reservation channel, a reply channel and a plurality of  
25 traffic channels, each of said channels corresponded to a unique spreading code, comprising:

means for receiving reservation packet signals each for requesting a traffic channel access

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transmitted by the plurality of radio terminals asynchronously with each other through said reservation channel, and separating said reservation packet signals into individual reservation packets for a receiving

5 process;

means for transmitting through said reply channel a reply packet for specifying a traffic channel and a time slot to be used to a radio terminal which is a source of said reservation packet; and

10 means for receiving a data packet transmitted from a radio terminal or for transmitting a data packet to a radio terminal in each time slot on a traffic channel.

14. A mobile communication system comprising a  
15 base station and a plurality of mobile terminals, radio channels between the base station and the plurality of mobile terminals comprising a plurality of traffic channels used for transmitting upward data packets directed from mobile terminals to a base station and  
20 for transmitting downward data packets directed from the base station to the mobile terminals, a reservation channel used for transmitting reservation packets each indicative of a traffic channel assignment request from a mobile terminal to the base station, and a reply  
25 channel used for transmitting reply packets each indicative of a traffic channel through which data is transmitted and received from the base station to a

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mobile terminal, each of said reservation, reply and traffic channels being assigned a unique spreading code in accordance with a code division multiple access (CDMA) scheme, wherein:

- 5           said each radio terminal comprises first means for transmitting a reservation packet onto said reservation channel at arbitrary timing when a request for data transmission is issued, and a second means for transmitting and receiving a data packet in a time slot
- 10 specified by a reply packet transmitted from the base station through said reply channel; and

- said base station comprises first means for separating a plurality of reservation packet signals having partially overlapped portions on a time axis,
- 15 received through said reservation channel, into reservation packets and performing a receiving process on said reservation packets, and fourth means for transmitting a reply packet for specifying a traffic channel and a time slot to be used, through said reply
- 20 channel, to each radio terminal which is a source of each received reservation packet.

15.       A mobile communication system according to claim 14, wherein:

- said first means of said each mobile terminal
- 25 applies a "spreading code unique to the reservation channel" having a period shorter than a spreading code applied to a data packet transmitted through the

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traffic channel by said second means to spread said each reservation packet; and

said third means of said base station processes a received signal with a matched filter in  
5 which said spreading code unique to the reservation channel is set, and separates an output of said matched filter into a plurality of signal trains corresponding to said packets utilizing the periodicity of said spreading code.

10 16. A mobile communication system according to claim 14, wherein:

said base station includes means for periodically transmitting busy tone information indicative of a traffic situation in its service area  
15 through said reply control channel or through a channel dedicated to the busy tone information; and

said each mobile terminal includes means for controlling the transmission of a reservation packet based on said busy tone information.

20 17. A mobile control system according to claim 16, wherein:

said base station includes means for estimating, based on a number of reservation packets received during a previous constant time period, a  
25 number of reservation packets to be generated during the next constant time period; and

said busy tone information is generated based on said estimated value and a number of packets

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scheduled to be transmitted during the next constant  
time period.

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